

Serial No.: 10/811,946
Docket No.: 9551003
Reply to Advisory Action of April 18, 2008, dated: June 2, 2008
Amendment After Final dated April 3, 2008
Reply to the Final Office Action of December 3, 2007

Amendments to the Claims

The listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A method of depositing a MgO film on a large area including a power control part to apply a voltage and an electric current ~~separately to~~ at least one magnesium target, the method comprising:

applying a voltage to the magnesium target by the power control part to generate a sputtering discharge thereon;

~~applying-increasing~~ an electric current applied to the magnesium target by the power control part to increase power on the magnesium target when the voltage on the magnesium target stops increasing in response to an increase in the applied voltage;
and

forming a MgO film on a substrate using magnesium particles emitted from the magnesium target.

2. (Cancelled)

3. (Original) The method of claim 1, wherein the voltage applied to the at least one magnesium target is between 250V and 300V when the voltage stops increasing.

4. (Original) The method of claim 1, wherein the current applied to the at least one magnesium target increases until the power applied to the at least one magnesium target is saturated.

5. (Original) The method of claim 4, wherein the saturated power has a frequency between 10 kHz and 100 kHz.

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6. (Original) The method of claim 4, wherein the duty ratio of the saturated power is between 30% and 60%.

7. (Currently Amended) An apparatus to deposit a MgO film within a large area comprising:

a magnetron part comprising at least one magnesium target and a permanent magnet positioned on one side of the magnesium target;

a power control part to apply a voltage and an electric current ~~separately~~ to the magnesium target, the power control part applying the voltage to the at least one magnesium target to generate a sputtering discharge thereon, and subsequently, applying to increase the current applied to the at least one magnesium target when the voltage on the magnesium target stops increasing when the applied voltage increases;

a flow control part to supply gases to the magnesium target;

a substrate control part to control a substrate on which magnesium oxides are deposited;

a vacuum control part to control a vacuum state in a chamber in which the MgO film is deposited on the substrate; and

a heater control part to maintain a temperature in the chamber.

8. (Cancelled).

9. (Original) The apparatus of claim 7, wherein the power control part operates under conditions between 10 kHz and 150 kHz in frequency, between 10% and 90% in duty ratio, less than 500 V in output voltage, and between 1 A and 50 A in output current.

10. (Original) The apparatus of claim 7, wherein the gases supplied to the magnesium target include oxygen and argon.

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11. (Original) The apparatus of claim 7, wherein the flow control part comprises an oxygen flow regulator, an argon flow regulator, cut-off valves to block off gas flow to the magnesium target, and a gas supply line to supply the magnesium target with the gases.

12. (Original) The apparatus of claim 7, wherein the substrate control part supports the substrate using a substrate-supporting member and adjusts movement speed of the substrate.

13. (Original) The apparatus of claim 7, wherein the vacuum control part comprises a vacuum pump, a vacuum gage and a pressure regulator.

14. (Original) The apparatus of claim 7, wherein the heater control part maintains temperature in the vacuum chamber between 100°C and 200°C and is distanced from the substrate by a spacing between 5 cm and 10 cm.

15. (Original) The apparatus of claim 7, wherein the heater control part comprises a separate power supply independent of the power control part.

16. (Previously Presented) The method of claim 1, wherein the electric current is a negative square wave.

17. (Previously Presented) The method of claim 7, wherein the electric current is a negative square wave.